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PUBLIC ACCOUNTS COMMITTEE
(1981-82)

(SEVENTH LOK SABHA)

DEVELOPMENT AND MANUFACTURE OF A WEAPON SYSTEM

MINISTRY OF DEFENCE

Presented in Lok Sabha on 30-4-1982
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PART II**

Minutes of sittings of the Committee held on :

22-12-1981
28-4-1982

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* Not appended to the cyclostyled copies of the Report

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** Ceased to be a Member of the Committee consequent on his appointment as a Minister of State w.e.f. 15-1-1982.

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INTRODUCTION

I, the Chairman of the Public Accounts Committee do present on their behalf this Hundred and Thirteenth Report on Paragraph 8 of the Report of Comptroller & Auditor General of India for the year 1979-80, Union Government (Defence Services) on Development and manufacture of a weapon system.

2. The Report of the Comptroller & Auditor General of India for the year 1979-80, Union Government (Defence Services) was laid on the Table of the House on 28-4-1981.

3. The Committee's examination has revealed that the Defence Research and Development Laboratory, Hyderabad could not develop or design the weapon system, entrusted to it in 1962, even over a period of ten years and the project had to be finally closed down in April, 1972, after incurring an expenditure of Rs. 28.72 lakhs. The Committee has felt that much of the extra expenditure of nearly Rs. 10 lakhs on the project could have been saved had the project been formally closed in August, 1970, since the user trials had been completed by them.

4. The Committee have found that orders for ground equipment were placed on a public undertaking even before successful development of a suitable mount for weapon 'A'. These had to be subsequently curtailed by 28.5 per cent, resulting in a redundancy of materials to the extent of Rs. 17.20 lakhs.

5. The Committee (1981-82) examined paragraph 8 at their sitting held on 22 December, 1981. The Committee considered and finalized the Report at their sitting held on 28 April, 1982. Minutes of the sittings form Part II* of the Report.

6. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix to the Report.

7. The Committee would like to express their thanks to the Officers of the Ministry of Defence for the cooperation extended by them in giving information to the Committee.

8. The Committee place on record their appreciation of the assistance rendered to them in the matter by the officers of the Comptroller and Auditor General of India.

NEW DELHI;
April 28, 1982
Vaisakha 8, 1904(*S*)

SATISH AGARWAL
Chairman
Public Accounts Committee

* Not printed. One cyclostyled copy laid on the Table of the House and five copies placed in Parliament Library.

REPORT

DEVELOPMENT AND MANUFACTURE OF A WEAPON SYSTEM

Audit Paragraph

1.1 In April, 1962, the Ministry of Defence sanctioned Rs. 6 lakhs for design and development of a weapon system by the Defence Research and Development Laboratory (DRDL); the amount was increased from time to time finally rising to Rs. 34 lakhs (August 1968). As the development of the weapon system was likely to take considerable time, a certain number of weapons 'A' and 'B' were imported from firm 'X' of country 'Z' during March 1968—March 1969 at a cost of Rs. 392.37 lakhs. Equipment (cost : Rs. 23.47 lakhs) to mount weapon 'A' on vehicle 'C' was also imported from the same firm. Subsequently, mounts of a different design offered by firm 'Y' of the same country were found more suitable and were, therefore, imported (October 1972) at a cost of Rs. 17.13 lakhs.

1.2 In a note of 1969 the Department of Defence Production stated that the weapon under development was not suitable for introduction in the Army as it would not meet its operational requirements. Nevertheless, it was decided (January 1969) by the Ministry of Defence to continue the project until completion of the development in order to enable the DRDL to derive "maximum benefit out of the project in areas of design development, engineering, trial techniques and evaluation methods of similar weapons. The project was, however, formally closed in April 1972 (technical activities having been closed in August 1970) after incurring an expenditure of Rs. 28.72 lakhs.

1.3 After the Army Headquarters (HQ) had theoretically assessed the operational suitability for development of weapon 'A'. Government approved (February 1970) the proposal to equip certain units with weapon 'A' mounted on equipment 'D' during the plan period of 1969—74 and to enter into a licence agreement with firm 'X' for its manufacture (with option for manufacure of its successor weapon) by a public sector undertaking to be set up for this purpose. A licence agreement for the manufacture of weapon 'A' and its associated ground equipment was accordingly concluded (March 1970) with firm 'X' on payment of licence fee of Rs. 94.52 lakhs in four instalments between 1971 and 1975. The agreement was effective for a period of 10 years. At the same time another agreement (valid for a period of 5 years) was concluded with the same firm for option to manufacture two of the successor weapons. The validity of the option was extended later to 10 years up to March, 1980. A sum of Rs. 6.75 lakhs was paid as deposit to be set off against the licence fee payable or to be refunded in full as would be mutually agreed upon. The licence agreement in respect of weapon 'A' was assigned in March, 1971 in favour of the public sector undertaking (hereafter

undertaking) set up in July 1970. An indent for certain quantities of weapon 'A' (estimated cost : Rs. 11.73 crores) and its associated ground equipment (estimated cost : Rs. 2.60 crores) was placed (March, 1971) by the Army HQ on the undertaking. Weapon 'A' and the ground equipment were required to be delivered in a phased manner during 1971—74 and April, 1972—September, 1973 respectively. The undertaking actually manufactured and supplied 100 per cent of the quantities of weapon 'A' indented and 71.5 per cent of the ground equipment.

1.4 To enhance the fighting potential of the formations, it was decided to deploy weapon 'A' with equipment 'D' and the Vehicle Research and Development Establishment (VRDE) was asked in December, 1969 to develop a suitable mount for equipment 'D'. A prototype of the mount developed (at a cost of Rs. 0.37 lakh) by the VRDE was subjected (January, 1971) to user trials, which revealed that the deployment of weapon 'A' with equipment 'D' did not permit full exploitation of the weapon as the characteristics of weapon 'A' and equipment 'D' were not compatible with each other. Keeping in view the operational requirements and effectiveness of weapon 'A', it was decided (February, 1971), that weapon 'A' should be mounted on equipment 'E' for some squadrons and on equipment 'F' for others. The VRDE was, therefore, asked (Febraury, 1971), to develop a suitable mount for equipment 'E' and on its successful completion to develop a mount for equipment 'F'; it was visualised then that this development task would be completed during 1969—74. The first mount developed by the VRDE for equipment 'E' was subjected to user-cum-technical trials in February, 1972 and certain modifications were found necessary to bring it to acceptable standards of operational efficiency. The proposed modifications were carried out, but the trials carried out (March, 1974) on the prototype after modifications revealed inherent weakness in its design and lay-out and the mount was found unsuitable. An expenditure of Rs. 1.60 lakhs had been incurred on the development of this mount. Further development of the mount was not considered cost-effective in view of the phasing out of the equipment 'E' by 1976-77 and the extended time that would be required for the development of the mount and its production. Also no development work had commenced on the mount for equipment 'F', which, if then undertaken, would have taken considerable time. It was, therefore, decided (March, 1974) not to mount weapon 'A' on equipment 'E' or 'F'.

1.5 Around the same time, an Army workshop developed amount for weapon 'A' on vehicle 'G' based on the mount imported (October, 1972) from firm 'Y'. This mount was found suitable during trials carried out in August, 1974. The Army HQ, therefore, obtained the approval of Government (April, 1975) for the development of weapon 'A' on vehicle 'G' instead of equipment 'D' or 'E' as envisaged earlier and also for incurring an expenditure of Rs. 57 lakhs on procurement of installation kits for vehicle 'G'. The Ministry of Defence stated (February, 1980) that a more detailed and exhaustive examination of the deployment 'E' for the quantities indented and had issued (September, 1971) after the trials were carried out on the mounts when it was found that

the technical and logistic requirements would be met by mounting this weapon on vehicle 'G'.

1.6 Then the development of the mount was in progress, the undertaking had planned the manufacture of ground equipment around equipment 'E' for the quantities indented and had issued (September, 1971) letters of intent to firm 'X' for supply of 11.4 per cent, 11.4 per cent and 5.7 per cent of the total quantity ordered in the form of completely assembled sets, sub-assemblies and components respectively. Letters of intent were also issued by the undertaking in March and May 1972 for supply of components for the balance quantity (71.5 per cent) except certain costly items which were proposed to be indigenised. In November 1972, the undertaking, however, placed an order for these items (cost : Rs. 17.69 lakhs) also as it was felt that during the time-frame available it would not be possible to indigenise the same. The order for ground equipment placed on the undertaking was reduced in January, 1975 by 28.5 per cent of the total quantity. The undertaking, which was requested to confirm acceptance of the reduction in the order without financial repercussion, replied (March, 1975) that since most of the items required for manufacture of ground equipment had already been procured (by December 1974), short-closure of the order at that stage would result in an infructuous expenditure of approximately Rs. 36 lakhs, though the exact figure would be known only after obtaining various details. After taking into account the requirement of spares for the expected life of the equipment, assessed by the Army HQ, the undertaking stated (June, 1977) that material of the value of Rs. 17.20 lakhs would still be redundant.

1.7 The following are the main points that emerge :

In terms of an agreement concluded with firm 'X' in March, 1970, no decision in this regard had been taken (October, 1980) for manufacture of two successor weapons to weapon 'A' (for which a deposit of Rs. 6.75 lakhs had been made), but no decision in this regard had been taken (October, 1980) and validity of the option expired in March, 1980.

Although weapon 'A' was considered (January, 1970) suitable for deployment with equipment 'D', in January 1971 the characteristics of weapon 'A' and equipment 'D' were found to be incompatible with each other.

Efforts for deployment of weapon 'A' with equipment 'E' also failed after spending Rs. 1.60 lakhs on development of mount for it.

Due to failure of efforts for deployment of weapon 'A' with equipment 'D' as well as 'E' and consequent on the decision taken to use the weapon with vehicle 'G', the order placed on the undertaking for associated ground equipment was curtailed by 28.5 per cent thereby resulting in redundancy of material to the extent of Rs. 17.20 lakhs. Had the order on the

undertaking been placed after successful development of a suitable mount for weapon 'A', the redundancy could have been avoided.

[Paragraph 8 of the Report of the Comptroller and Auditor General of India for the year 1979-80, Union Government (Defence Services)]

1.8 The Committee desired to know about the anticipated time schedule for completion of the project for design and development of the weapon system (Anti-tank missile) for the Army sanctioned in April, 1962. The Ministry of Defence stated :

"The GSR framed and given to the R&D Organisation had visualised the completion of the project "as early as possible". But it was not considered practicable to fix up a time bound schedule for completion of this project as the same was for an altogether new field of technology for which adequate knowhow or even the basic infrastructure did not then exist in the country. It, was however, unfortunate that the operational requirements of Army had changed for a weapon of longer range by the time indigenous weapon was evolved. It was in view of the changed requirement of Army which was of urgent nature that a decision had been taken to establish the production of the weapon system in the country for licence production during 1970."

1.9 On the aforesaid note of the Ministry of Defence, the Office of the Director of Audit, Defence Services offered the following Comments *VIDE* their U.O. No. 299 DDP-66/78-79/(30/78-79) Vol. III dated 30 July, 1981 :—

"It would be seen from para 7 of the statement of case prepared in the Ministry of Defence/Department of Defence Production in connection with the issue of Ministry of Defence letter No. 88163/RD-16/342/S|D|(R&D) dated 22nd April, 1966 for design and development of Anti-Tank Guided Weapon that it was expected that the project would be completed within 18 months to 2 years."

1.10 In the light of the aforesaid audit comments, the Ministry of Defence in a subsequent note, elaborated the position as follows :—

"As stated in the reply already furnished no time schedule for its completion was fixed when the project was sanctioned in 1962. However, during 1966, when the revision in cost was asked for, it was expected that the project can be completed in 18—24 months on the assumption that with the impetus given to the private industry because of the Indo-Pak conflict of 1965, there will be much more assistance from the trade for development of small components."

1.11 Asked whether it was a fact that the defence authorities were in a hurry to get the weapon system, the representative of the Ministry of Defence stated :

"We were. But, unfortunately, even though we were very much in a hurry and we got pushing them as a user, we realised that they are doing their best, starting for the first time with this type of technology. This particular item was the first one, that the new establishment of DRDL was entrusted to take up. It involved a complex technology both of propulsion as well as guidance control, flight mechanism and so on. Every body in the establishment know that not only the technology is new but the people were also new. None of them had any past experience of this technology. It was an example of *ab initio* development."

1.12 Elucidating the position about sanctioning of the project for design and development of the weapon system, the representative of the Ministry of Defence stated as follows in evidence :

"It was in January 1964 that the project was sanctioned at the initiative of the user. At that time we said we had full confidence to go ahead. It was in January 1964 that it was converted into a staff project, the user requirement and all that. That was a staff project."

1.13 Elaborating about the nature of such design and development projects, the Defence Secretary stated in evidence :

"There are two types of project. Some they start on their own, which is designated as competence building project. The other works are given to them by the user agencies, which are separately sanctioned. There we work to certain requirements given by the user agency."

1.14 The Committee pointed out that initiative was taken by DRDL to build up competence in the field of missile technology in April 1962 without the user asking for the weapon system. It was only in 1963 that the user indicated their requirement. The Committee enquired as to how the DRDL decided to go in for missile technology for which Rs. 6 lakhs were granted, when the user's requirement came a year later. The Defence Secretary stated :

"They keep on studying the developments in the world, and try to pick up new items and this appears to be one such case."

1.15 Elaborating the position further, the representative of the Ministry of Defence stated :

"It is not as if, before we give a project to DRDL, there is no dialogue between the two of us. There is a continuing dialogue. Even when they take up the question of competence for building projects, we sit on the committee which clears it. We ensure to the extent possible that given the competence for building projects, things are used subsequently. The inter-action is there. It is not from a vaccum that they decide....we had seen demonstrations of this missile in 1961-62. So, we are aware of the technology that was available."

1.16 The Committee desired to know the exact nature of the design and development work done from 1962 to 1964 together with the reasons for delay in leading to its formal closure in April 1972. The representative of the Ministry of Defence stated :—

> "At that time we did not have even competent people, leave aside competence in technology. It had to be competent in technology in different disciplines. The technology involves the industry also. It was started as Staff Project in 1964. When it was sanctioned, everybody was new to the technology.... In the meantime, it was shifted from Delhi to Hyderabad. Then the work was started for designing the missile to meet the war requirements. You will see that from January 1964 onwards, about 100 complete rounds were assembled and fired by DRDL. The work was started in 1964 and it culminated in firing 100 complete rounds at user trials which included the propellants, guidance system, control system and everything which had been developed in the country. In 1965, I mean, within a period of one to one and a half years, we were expecting response from the industry. There was an encouragement to take up the defence work. It was the time when the feeling was generated that we could solve some of the problems with the help of this industry. But when we actually started doing the work, it was felt that the infrastructure available in the industry was not up to mark. There is proof of that. However, everything was done ultimately by DRDL. That is why, the time taken was more. I would like to submit that you can check from any other country which has a complex system or from any advanced country which has a higher technical know-how and base. They took even more time. So this is something worthy of credit. The DRDL itself was in infancy in early 60's. The industry did not have the infrastructure. This was a very very typical and complex equipment.
>
> We might have failed in the promises made but promises were made in a particular context under which nobody had previous experience. What had come about in that period of six years is that 100 rounds were fired and it is a credit. There were four ordinary wires to communicate for controlling the missile in four directions—up and down ; left and right. The wire has to be flexible enough and not to deviate the missile. The missile should have free flight and strong enough not to get broken. It should guarantee that signals go uninterrupted. This is a new technology which we have developed including gyroscope."

1.17 The Committee pointed out that from 1962 to 1972, when the project was finally closed down, the DRDL could not develop or design the weapon system in a period of ten years. The Secretary (Defence Production) clarified :

> "I think, we have to look at the situation existing at that time when this project was taken on hand at the initial stage in the R&D itself, when the technology was unknown. A new R&D unit

was set up to build up expertise and it was assigned a project for further development. The unit had to be physically moved out from Delhi to Hyderabad soon after the project was given to them. It was around 1964 that the users took this project seriously... From 1964 to 1970, when these were subjected to users' trials, that is a period of six years. It is not a long time. The result of the users' trials was that they were able to achieve 64 per cent reliability at the range of 1500 yards as against 90 to 95 per cent reliability at a range of 2000 yards. It is not an unsatisfactory achievement looking at it purely from the R&D effort point of view."

1.18 Asked whether it was not the requirement of users in 1962 that the weapon system should be developed at the earliest, the Secretary (Defence Production stated :

"In 1966, the R&D had already indicated that they might be able to complete the project in 1-1/2 to 2 years.

In retrospect the period of 18 months or two years has to be disregarded. The Laboratory had to be set up from scratch. A team had to be put together to take on a project in a new field. Basic facilities had to be set up. The time frame projected was too optimistic. The intention of going ahead with the project was to build up competence in missile technology.....It fell short of the users' requirements both in range and reliability."

1.19 Asked as to when the position about the range and reliability was pointed out to the users and why the project was not closed at that time. The representative of the Ministry of Defence stated:

"It was obvious that it could not meet user requirements. A system like that with 64 per cent reliability and lesser range than what they needed could not be put into operation. And they had an option to get something which would meet their requirements. So, they exercised that option and did not depend upon us. Our decision was taken at a high level.

Briefly I would inform you that it is because we carried the project to its logical conclusion, so that we could learn the design technology, the evaluation techniques, and could understand the problems properly. That enabled us to go to the next step of taking up a missile system, and in 1978 a ground-to-air missile, a complete missile, a totally indigenous missile, was fixed off with 35 km. range. The achievement included a high level of technology, the next level of technology. It included developing new propulsion technology and guidance and control system and various components were developed. That enabled us to go the next level, and that is now reflected in the present defence plan where we have projects for undertaking development of several types of missiles ; anti-tank, surface-to-surface missile ; these projects are now under the current Defence Plan. This is the level of technology that we have reached. Even in the propellant technology we have developed a liquid fuel in the R&D."

1.20 Further elucidating as to why it was decided in January 1969 to continue the development project when the weapons under development did not meet the operational requirements of the Army, the Ministry of Defence stated as follows :

> "The progress of this project was regularly monitored by the Steering Committee. Although a decision for initial outright purchase and licence production was taken to meet the urgent operational requirements of the Army, it was considered necessary to continue further development work on this project to enable the scientists in the Defence Research and Development Organisation to derive maximum benefit from this project in the areas of design, development, engineering trial techniques and evaluation methods of similar weapons. The continuance of this project helped in competence building and establishing technological base in the country for this highly sophisticated field of missile technology."

1.21 The Committee called for a break up of the expenditure incurred on development of the weapon system upto January 1969 and that incurred thereafter. The Ministry of Defence stated :

> "Break-up of the expenditure incurred on development of the missile system upto the end of January 1969 and that incurred thereafter is as follows :

	Rupees
Upto and of January 1969	27,63,885.98
From February 1969 till the closure of the project . . .	1,08,814.75
	28,72,700.73

> This represents the net expenditure. The actual expenditure booked on this project from February 1969 till closure was Rs. 9,91,245.26, but a credit of Rs. 8,82,430.51 has been given to the project on account of salvage items/assets utilised elsewhere on closure of this project."

1.22 Asked about the stage of development till January 1969, when it was decided to continue the development, the Ministry of Defence stated :

> "In the course of development, intensive flight trials of fully guided rounds with smoke warehead were carried out during July to December, 1968. Guided rounds with high explosive wareheads were fired in January 1969. Thus the development work was in an advanced flight trial stage by January, 1969."

1.23 Asked why the project was discontinued in 1972, the representative of the Ministry of Defence stated :

> "On that project, whatever best we could achieve we have achieved. A new propellant had to be developed. So, that project has come to a close after learning whatever we could learn from there. After that we have developed so many other things."

1.24 Asked when exactly it was realised that this weapon would not meet the requirements of the army, the representative of the Ministry of Defence stated:

> "Strictly speaking, it was only after we fired these 100 rounds. That was in June to August, 1970. Whatever best was available at that time, we preferred to user trials."

1.25 The Committee desired to know the extent to which the expertise developed after 1969 was being utilised in the missile technology in so far as the requirements of the armed force were concerned. The representative of the Ministry of Defence stated:

> "The next major step was the surface to air missile. In 1978 it was proved that we had achieved that capability. This is currently in the defence plan which has been approved jointly by the three Chiefs and that job is now in hand with the R&D. The major step was the missile which was fired in 1978. Since then we have put up a number of proposals. Users have examined them. This was discussed in the committee for defence planning and finally projects have been given to R&D."

1.26 The Committee further enquired about the reasons why the LRLL could not achieve what was expected of them. The representative of the Ministry of Defence stated:

> "There are two aspects. One is the range and the other is the reliability. If we had carried on to make more prototypes, improve the quality of this component and improve the training of the operators, then we would have certainly got better result. 65 per cent improvement now, next time 70 per cent improvement, and like that we could have improved upon it, because we know the components are functioning, only the quality improvement has to take place. We cannot say how much improvement would be there, but certainly improvement would have been possible. The second aspect was the range. At that point of time we could not improve upon it. At that time only one or two types of propellants were made in this country. Today our country is almost selfsufficient. There is almost every type of propellant. A lot of R&D work has been done on that. But at that point of time we had only one or two propellants. So we knew that with those one or two propellants one could not fire better. There was a technological limitation regarding that."

IMPORT OF ANTI-TANK MISSILES

1.27 It is seen from the Audit Paragraph that as the development of the weapon system was likely to take considerable time, a certain number of weapons 'A' and 'B' were imported from firm 'X' of Country 'Z' during March 1968-March 1969 at a cost of Rs. 392.37 lakhs. Equipment (cost Rs. 23.47 lakhs) to amount weapon 'A' on vehicle 'C' was also imported from the same firm. Subsequently mounts of a different design offered by firm 'Y' of the same country were found more suitable and were, therefore imported (October 1972) at a cost of Rs. 17.13 lakhs.

1.28 The Committee desired to know the reasons for importing weapons 'A' and 'B' in 1968-69. The Defence Secretary stated.

> "The indications were that the project prototypes was not read 'Y' and the inital trials had not proved very encouraging. But there was a need for this kind of a guided weapon system. So the decision to import initially was made in 1968."

1.29 The Committee desired to know the basis on which the amount offered by firm 'Y' was selected and on what type of vehicle the mount for weapon on 'A' was recommended by firm 'X'. The Ministry of Defence stated :

> "Subsequent to the acquisition of 10 mounts for use of weapon system 'A' in a vehicular on figuration from firm 'X' it was decided to procure additional mounts for weapon system 'A' to make the regiment fully mobile. While the feasibility of manufacturing additional mounts to the design of firm 'X' from whom we had already purchased some quantity of these mounts, was being explored, firm 'Y' offered us a weapon mount developed by them which was claimed to be suitable for weapon system 'A' and weapon system 'R'. A sample mount was brought by firm 'Y' to India at their own expense for evaluation trials without any commitment on our part for its purchase. The user trials conducted by the regiment proved the suitability of this mount under our environmental conditions."

Deployment of Weapon 'A' with equipment 'D'

1.30 It is seen from the Audit Paragraph that to enhance the fighting potential of the formations, it was decided to deploy weapon 'A' with equipment 'D' and the Vehicle Research and Development Establishment (VRDE) was asked in December, 1969 to develop a suitable mount for equipment 'D'. A prototype of the mount developed (at a cost of Rs. 0.37 lakh) by the VRDE was subjected in January 1971 to user trials, which revealed that the deployment of weapon 'A' with equipment 'D' did not permit full exploitation of the weapon as the characteristics of weapon 'A' and equipment 'D' were not compatible with each other.

1.31 Asked whether the Vehicle Research and Development Establishment was associated with regard to mounting of Weapon 'A' on Vehicle 'C' in the first instance, the Ministry of Defence stated :—

> "VRDE was not associated in the first instance to develop a mount suitable for installation of the weapon system on Vehicle 'C'. In fact, the original planning was that the weapon system 'A' would be deployed partly for ground configuration and partly for vehicular configuration. For this purpose 10 vehicle mounts were required which were purchased from supplier of weapon 'A' i.e. firm 'X' along with the weapon system itself. The initial number being so small it was not considered even economically viable to develop and produce it indigneously."

1.32 Further asked as to why the long range requirements were not considered with a view to developing an indigenous mount, the Ministry of Defence stated :

"The weapon system when acquired was completely new to the Army. As such, the long range requirements were considered only after experience was gained on the system and thereafter the mount designed indigenously was utilised"

1.33 The Committee desired to know the reasons for changing the mount required for Vehicle 'C' to equipment 'D' for the purpose of mounting Weapon 'A'. The Ministry of Defence stated :

"Weapon 'A' has a longer range of firing than the armament system provided on equipment 'D'. The original aim of fitting this weapon on equipment 'B' was therefore to supplement the fire of the equipment 'D' and achieve a longer range than that of the armament system installed on this equipment. This would have increased the effectiveness of the equipment. Also weapon 'A' in its ground configuration or when mounted on wheeled vehicles would have seldom afforded fields of fire to permit its exploitation upto the maximum range. It was on these considerations of exploitation of fuller range of weapons and also to enhance the firing range of the equipment 'D' that a decision was taken to develop a suitable mount for weapon system 'A' on equipment 'D' and to carry out a technical feasibility of complementing the two weapons on a single platform."

1.33 A The Committee desired to know as to why the factors pointed out in January 1971 by the VRDE were not aken into account at the time equipment 'D' was chosen to mount these weapons and before entrusting the development of the mount to the VRDE. The Ministry of Defence stated :—

"The task of developing a suitable mount for mounting weapon 'A' on equipment 'D' was taken up during December, 1969. VRDE on completion of the development work offered a prototype for user trials during January, 1971. During the user trials it was observed that the mounting of weapon 'A' on equipment 'D' did not permit full exploitation and the characteristics of weapon 'A' and armament system of equipment 'D' were not compatible. In addition it was also realised at this stage that the equipment 'D' after fitment of weapon 'A' no longer retained its offensive character and the proposal had therefore to be shelved.

In addition to the above observations during user trials in January, 1971 there were no other factors pointed out by VRDE either before or during the time period when the development work was in progress. After discussion with the Audit authorities it has been revealed that the question was intended to seek information as to why what has been revealed during trials could not be foreseen while the project was initiated. In reply to this

it is stated that the proposal to mount weapon 'A' on equipment 'D' was primarily to supplement the fire of the equipment 'D' to increase its effectiveness this would have also afforded full exploitation of weapon 'A' to its maximum range when mounted on equipment 'D'.

It may also be noted that concept of a weapon conceived from a tactical doctrine may undergo change as a result of experience in operation."

1.34 The Director of Audit (Defence Services) has offered the following comments on the aforesaid position stated by the Ministry :—

"One of the factors against the full exploitation of the missile with equipment 'D' revealed during evaluation trials was that during the period tank remained stationary for firing missile, the main armament was immobilised. This factor may please be specifically brought out in the Ministry's reply."

1.35 Elaborating the position in the light of the aforesaid audit comments, the Ministry of Defence intimated as follows in a subsequent note :

"To further clarify it may be mentioned that during the period when the missile is fired i.e. from the time the missile is launched till the time it hits the target, the crew cannot operate the Main Armament (Main Gun) as the gunner canont be diverted from the control of the missile till it hits the target ; besides firing of the main gun simultaneously would completely upset the launched missile which needs to be tracked continuously from the time of launch till the time of its hitting the target."

1.36 The Committee desired to know whether the matter was discussed thoroughly with the VRDE before assigning the project to them. The Ministry of Defence stated as follow :—

"Normally a project is assigned to the Research and development Organisation only after a technical feasibility is established. In the present case, the technical nature of development of the mounths was discussed with the VRDE prior to assigning the project. The tactical aspects, because of which the project was given up latter, were not discussed with the VRDE as these aspects were not their concern.

1.37 In reply to a question by whom the proposal was first mooted and whether it was examined by any team of experts, the Ministry have stated :

"The proposal was based on the theoretical concept of the Army. As pointed out earlier, the technical feasibility is considered by the Army before a project is assigned to the R&D Organisation. The proposal to mount weapon 'A' on equipment 'D' was later on dropped due to tactical considerations and not on any technical ground."

1.38 In a note dated 9-12-1974 the Ministry of Defence had mentioned that no other country in the world had mounted anti tank missile on a medium tank except France. Since the characteristics of weapon and Equipment were not compatible, the Committee enquired as to why it was decided to deploy the weapon system with equipment D. The Ministry of Defence stated :

> "Obtaining the optimum utility of a weapon system is a constant endeavour and requires exploring various methods of utilisation. As a result of these efforts the most suitable and effective way of exploiting a weapon system is evolved to meet the operational requirements. An idea is conceptually developed first and its viability is physically evaluated later on. Quite often the benefits envisaged at the conceptual stage do not materialise at the trial stage.
>
> It is correct to an extent that no other country in the world had mounted an anti tank missile on a medium tank except France. The USA had, however, a system where the missile and the anti tank rounds were fired from the same launcher in the Sheridan tank. In our case the concept was the instead of firing from the same gun, the missile and the anti tank rounds would be fired from the same platform. It was also realised that both the missile and the anti tank round could not be fired at the same time but there was great scope for exploring the long range of the missile evn at the cost of the tank becoming stationary for a short duration. It was hoped that the disadvantage arising out of the immobility of the tank for a short time would be more than offset by the longer range of the missiles. Unfortunately, this did not come true."

Development of equipment 'A' with equipment 'E', equipment 'F' an development of suitable mounts

1.39 The Committee desired to konw the basis on which it was decided in Feb. 1971 to use Weapon system with equipment 'E' and why the development of amount for the equipment had to be abandoned after spending Rs. 1.60 lakhs. The Ministry of Defence stated :—

> "Practical experience gained after the trials of the missile system on Equipment 'D' showed that giving primacy to the missile system over the tank gun rendered the tank itself less suitable for offensive operations. It was also found that it was not possible to exploit the maximum range of the missile, viz. 3,000 metres as in majority of cases battle ranges beyond 2,000 mts. would not be available for tank engagments. It was thus felt that the concept of supplementing the tank gun by missiles was more suited for a light tank|armoured personnel carrier which did not have a gun comparable to that of a Main Battle Tank. Therefore, after the projcet to arm the Equipment 'D' with Weapon 'A' was dropped, it was decided to mount the missiles on equipments 'E' and 'F'. The former were considered more

suitable for mounting the missiles as these were not intended to be used as main battle tanks (MBT) during an armoured thereto.

2. In 1971, when the decision was taken to use Weapon 'A' with equipment 'E', it was expected that equipment 'E' would remain in service for another 5 to 6 years and it was anticipated that a suitable mount for this purpose would be developed in about a year's time. Although two prototypes were developed by the VRDE, the mount was not found suitable. as equipment 'E' were scheduled to be phased out by 1976-77, it was decided in 1974 to drop the project after spending Rs. 1.60 lakhs on it. It may be added that, with the advent of Infantry Combat Vehicles (BMPs) the concept of mounting missiles on a light tank or an APC is no longer relevant as the BMP has an anti-tank missile system mounted on it. BMPs have been introduced into service since 1978.

There were not inherent deficiencies in the design and lay out of the mount developed for equipment 'F'. But during the trials on the first prototype (Feb. 1972) some modifications were considered necessary. These modifications were incorporated in the improved version in 1974. But still it needed some improvement. Since it was already too late to proceed with the project further, in view of the scheduled phasing out of the equipment, the project was dropped."

1.40 The Committee enquired as to why the inherent weaknesses in the design and layout of the mount could not be revealed during trials on the prototype of the mount for equipment 'E' carried out in February, 1972. The Ministry of Defence stated :

"During the trials on the layout of the mount designed for equipment 'E' conducted in February, 1972 a number of additional modifications were considered necessary to be incorporated in equipment 'E' for mounting weapon 'A' before its introduction in service use. General Staff approval was, however, accorded during May, 1972 for introduction of this mount in service use after all the modifications have been incorporated and troops trials have been conducted on the modified mounts. During 1972, 14 mandatory modifictions to be incorporated and 5 desirable modifications were considered. During the trials of the improved version in 1974, most of the midifications suggested as a result of 1972 trials had already been incorporated but the mount still remained wanting for a few more desirable features to be incorporated. The defects which were brought out during 1974 trials did exist in 1972 trials. The 1974 version was an appreciably improved version but it still had some deficiencies which were considered necessary to be eliminated befor the equipment 'E' with weapon 'A' mounted on it could be considered fully acceptable for being passed into the hands of the users."

1.41 Asktd why the fact of phasing out of equipment 'E' was not known earlier, the Ministry of Defence stated :

> "It was in year 1971 that a decision was taken to use equipment 'A' with equipment 'E' when equpiment 'E' was expected to be in service use for another 5 to 6 years. It was also the expectation that the mount suitable for use of weapon 'A' on equipment 'E' would be made available by the Defence Research and Development Organisation in about a year's time. It would thus have provided adequate utilisation of the mounts designed and produced for use on equipment 'E'. Had this expectations gone through, the phasing out of equipment 'E' from service would have also been deferred for some more time. There is no rigidity in phasing out an equipment from service which depends on several factors like their utility, spares position, overhaul programme and mechanical condition, etc. It was, however, unfortunate that the development of the mount before its successful acceptance by user's continued for a much longer period than it was originally anticipated. It was only after the unsuccessful user trials during 1974 that a decision was taken not to proceed ahead with further development work as even if the successful mount is developed in another one to two years time it will have a limited utility because the inandequate residual life of equipment 'E' shall not permit their full utilisation. The decision not to proceed ahead with further development work for mounting weapon 'A' on equipment 'E' was therefore a deliberate decision in view of the position of development of the mount versus phasing out of equipment 'E' which then existed. It may also be noted that planned phasing out of equipment at times is not carried out on schedule due to various reasons. Presently two units worth of this equipment are still in service."

Development of weapon 'A' on vehicle 'C'

1.42 It is seen from the Audit Paragraph that around the same time an Army workshop developed a mount for weapon 'A' on vehicle 'G' based on the mount imported in October 1972 from firm 'Y'. This mount was found suitable during trials carried out in August 1974. The Army HQ, therefore, obtained the approval of Government in April 1975 for the development of weapon 'A' on vehicle 'G' instead of equipment 'D' or 'E' as envisaged earlier and also for incurring an expenditure of Rs. 57 lakhs on procurecment of installation kits for vehicle 'G'.

1.43 The Ministry of Defence intimated Audit in February 1980 that a more detailed and exhaustive examination of the development of weapon 'A' with equipment 'D' and 'E' was carried out only after the trials were carried out on the mounts when it was found that the technical and logistic requirements would be met by mounting this weapon on vehicle 'G'.

1.44 The Committee desired to have information on the following points :—

(a) When was the work on the development of Vehicle 'G' based on the mount imported in October, 1972, initiated ?

(b) Was this fact contemporeneously made known to the agency engaged in the development of a suitable mount for equipment 'E' ?

(c) What steps were taken to correlate these developments ?

(d) When was it finally established that the technical and logistic requirements would be met by mounting this weapon on Vehicle 'G'.

In a note, the Ministry of Defence have stated :

"The development of the mount for weapon 'A' on Vehicle 'G' was assigned to the EME by the Army HQrs. in March 1974. Simultaneously, the development of mounts on equipment 'E' and 'F' was terminated.

The development of mounts on equipment 'E' and 'G' was not simultaneous. Also, the characteristics of the mounts for equipment 'E' were different from those of equipment 'G' since the former was a turreted and tracked armoured fighting vehicle which the latter was a wheeled logistic vehicle.

The development of mount on vehicle 'G' was started after the termination of development of mount for equipment 'E'. Therefore, there was no possibility of correlating the two.

The successful trials during July-August 1974 established that the staff requirements would be met by mounting this weapon on vehicle 'G'."

1.45 Asked whether weapon 'A' was being used with vehicle 'G', the Ministry of Defence stated :

"The SSI IBI missile is currently in use with Jongas/Jeeps and this combination has proved successful."

Redundancy due to reduction of order for Ground equipment

1.46 It is seen from the Audit Paragraph that when the development of the mount was in progress, the undertaking had planned the manufacture of ground equipment around equipment 'E' for the quantities indented. The order for ground equipment was reduced in January, 1975 by 28.5 per cent of the total quantity. The undertaking which was requested to confirm the acceptance of the reduction in the order without financial repercussion replied in March, 1975 that since most of the items required for manufacture of ground equipment has already been procurd by December, 1974, short closure of the order at that stage would result in an infructuous expenditure of approximately Rs. 86 lakhs.

1.47 The Committee desired to konw as to why the public undertaking had undertaken manufacture of ground equipment around equipment 'E' if the mount had not yet been developed and the possibilty of use of weapon 'A' with equipment 'E' was not certain. The Ministry of Defence stated :

"The project for developing a suitable mount for equipment 'D' was dropped in early 1971 mainly for tactical reasons and not

due to technical flaws. The technical feasibilty of mounting missiles on medium tanks had already been establised. As such, when a mount was being developed for equipment 'E' for weapon 'A', it was expected that not only would the trials be successful but the project would materialsise within a year or so. Hence orders for ground equipment around equipment 'E' were placed on M|s. ..... in March 1971 in anticipation of the successful development of the mount. Further, due to the situation prevailing on our borders at that time (1971), there was great urgency for getting the mount and ground equipment speedily and so orders were placed on M|s. .....without waiting for the successful development of the mount in order to save time. The development of the mount was, however, dropped due to the time factor involved in the development and the proposed phasing out of Equipment 'E'. This led to a curtailment of the orders placed on M|s....leading to a redundancy of materials worth Rs. 17.20 lakhs. The system has now been streamlined and no orders are placed on any firm| undertaking until development of an equipment is complete, proven successful during evaluation trials and a decision taken to go in for the equipment."

1.48 Asked about the time frame envisaged for indigenisation of the item and the reasons for the delay in doing so, the Ministry of Defence stated :

"An order for the ground equipment was placed on M|s... in 1971. M|s..... in turn, placed an order on their principals abroad for supply of necessary components and materials The lead time for obtaining supplies from them was two years and the time required for assembly at.....was one year after recipt of the supplies from abroad. The suppliers supplied the components and materials on time. The decision to reduce the order was conveyed to M|s.....in January 75. By that time the work on manufacturing the ground equipment had reached near completion and reduction in the order without financial implication was not possible. There was no question of delay in production of the ground equipment."

1.49 Asked about the utilisation of redundant material worth Rs. 17.20 lakhs, the Defence Secretary stated in evidence :—

"Attempts have been made to utilise it as much as possible. But they were unable to utilise the balance material worth Rs. 17.20 lakhs."

1.50 In a subsequent note, the Ministry of Defence explained :

"The total value of 140 sets of the ground equipment ordered on M|s..... was Rs. 2.10 crores. As a result of the reduction of the remaining surplus material. The material that cannot valued Rs. 36 lakhs. After finding alternative uses and making provisions for life-time spares, the surpluses have been reduced to Rs. 17.20 lakhs. Attempts are being made to make use

of the remaining surplus material. The material that cannot be utilised by the Army or M|s..... will be disposed of to the best advantage of the State according to rules."

1.51 Asked whether the redundancy to the extent of Rs. 17.20 lakhs could have been avoided, has the order on undertaking been placed after successful development of a suitable mount for weapon 'A'. the Ministry of Defence have replied :—

"It is correct that had the orders for the ground equipment been placed after successful development of a suitable mount for weapon 'A' the redundance could have been avoided. The orders on M|s .....were, however, placed on reasonable expectation of a successful development of the mount on equipment 'E' and the urgency for obtaining the mounts quickly because of the conditions prevailing in 1971.. A policy decision has since been taken that no anticipatory orders will be placed on any production agency unless evaluation and trials have been successfully carried out and the product has been found suitable for introduction into service."

1.52 The Committee desired to know the reasons for Government's inability to take a decision on the question of two successor weapons to weapon 'A' within a period of 10 years of conclusion of agreement with firm 'X' i.e. by March, 1980. The Ministry of Defence stated :

"The option Agreement with firm 'X' was entered into on the 2nd March 1970. The Agreement was initially valid for a period of 5 years but was later extended to 7 years by a supplementary agreement, i.e., upto March 1977. The system ..... was first tried by the Army in 1973 and again in 1978. On account of technical defects noticed by the user, no final decision could be taken before these were rectified. The option Agreement was therefore, further extended from time to time and lastly upto June 1982. The option to produce a successor woapon system viz., ... was exercised in Oct. 1981. The other successor weapon system, viz. is presently under evaluation.

1.53 The Committee enquired about the present position with regard to the question of adjustment of advance of Rs. 6.75 lakhs against the licence fee for the new generation of weapons. The Ministry of Defence stated :

"An amount of FF 5 lakhs was deposited by the Government of India with the foreign firm for the successor weapon systems. Out of that, an amount of FF 2.5 lakhs has already been adjusted against the first instalment of licence fee paid to the foreign firm in Nov. 1981 on account of the contract. As brought out earlier, the introduction of the other successor weapon system is under consideration. Depending on its out-

come, steps will be taken either to adjust the balance amount of the deposit, viz. FF 2.5 lakhs against the licence fee to be paid for the manufacture of the missile in India or to secure its refund."

1.54 The Committee desired to know the steps which have been taken for development and manufacture of the successor system indigenously and what were the anticipations in this regard. The Ministry of Defence stated :

"A contract for the manufacture of a successor weapon system, ivz. .....under licence has been concluded in Oct. 1981. This system will be manufactured at M|s....., Hyderabad and production is scheduled to commence from 1984-85. As stated earlier, the other successor weapon system, viz. .....is presently under evaluation."

Working of Defence Research Laboratories

1.55 The Committee desired to know the views of the representatives of the Ministry of Defence with regard to the functioning and performance of the Defence Research Laboratories and how these could be strengthened. The representative of the Ministry of Defence stated in evidence :—

"One is competence building; we have to make ourselves updated; we have to equip ourselves to the task; we should acquire the necessary competence. If there is something which is within our competence, we say, yes, this is within our competence, we can perform this thing.....side by side. Army Navy and Air Force make their requirements known to us. They specify how the equipment will be used—its range, performance criteria etc. which they visualise. We tell them what is the advanced technology we know of. We tell them what we are capable of. On the basis of that the project is sanctioned. Financial implications are studied and the project gets sanctioned. All this is oriented towards a result. Certain prototypes are made. We may not be successful always. Some kind of provisional date of completion is always indicated, except where it is competence building and there also before funds are sanctioned, it is indicated as to what we expect to get out of this particular competence-building programme. Some times we are successful ; some time we are not. When the project is sanctioned, we have a monitoring system. This is done by Director himself. He gets weekly or monthly report and also reports to the headquarters. He says how things are going, what problem he is facing etc. These things are discussed. There is the involvement of the industry. There is involvement of the users concerned. We keep them in touch as to how we are progressing, we sav whether we can meet their requiremetns or not. I is not a rigid, but it is all a flexible

thing. All the parties participate in a discussion or dialogue. The one common aim is to achive the best possible result, acceptable to the user. Only when the user says, yes, this meets my requirement, it can be passed on for production. Secondly, we have got Research and Development Panels in area like Armaments, Electronics and so on. Eminent persons from outside participate in those forums which are held once or twice or thrice a year."

1.56 Asked to what extent these Laboratories were able to meet the defence requirements, the representative of the Ministry of Defence stated:

"It is difficult for me to give the percentage figures. For the last 30 years, we have been seeing them. I can say this definitely that there has been a sea-change in the last few years. Earlier they were groping around. But I must say that in the past few years, throughout the services, there was little lack of confidence in them because in the earlier days competence was low but their enthusiasm was high. So there were promises but invariably they were never kept up within the time-schedule. Many times the projects could not succeed. But I must say that they have gone a long way and they are doing very well today. I am not saying that at the moment everything is perfect, But I would say that they are doing very useful work."

1.57 The Committee desired to know whether any study or evaluation with regard to the performance of these Laboratories had been made and if so what the findings were. The representative of the Ministry of Defence stated:

"The main task of these laboratories is to meet the targets laid down for them. There are development panels to look into that. In-house, there are technical advisory committees which monitor the progress of these projects at 3 months' interval or so. The evaluation is done in terms of what they have achieved against planned for. The evaluation is done project-wise. The overal performance evaluation is mainly done in terms of financial terms by the Directorate at the headquarters.

That in-house evaluation is done by the technical advisory committees appointed by the Scientific Adviser, where all the chief controllers, Directors of the laboratories concerned and the other laboratories with whom they have to collectorate are the members. These committees are expected to meet once in three months, and at the most once in four months. They take stock of each laboratory and all the difficulties are brought out at that time.

Where the Directors are not able to find a way out within their means, they consult the Technical Advisory Committee. What the Committee is unable to solve is put up to the Scientific Adviser. He personally looks into it during his visit to these places. That is a scientific and technical problem. They are not able to do much and find out how other industries can. Through collective wisdom, we are trying to find a solution.

This evaluation is done every 3 or 4 months. This is only related to the situation where laboratories are unable to progress. But project-wise evaluation is done every year."

1.58 Asked whether any comprehensive evaluation had been carried out to ascertain the shortcomings, the Secretary (Defence Production) stated:

"You are raising an overall, macro-level aspect. During the last 3-4 years, there has been a total review of all the projects, of all the laboratories. As a result of a detailed screening, they have giving up a large number of small projects some of which were perhaps picked up for want of any specific assignments to them. It is also a development of the last few years that the inter-action between the users and the production agencies and IRDO is as close to perfection as possible, in a situation which is necessarily imperfect. The entire long-term perspective plan is now getting more and more integrated. The Defence Plan has three basic segments; (a) Army, Navy and the Air Force, (b) Defence Production and (c) the integrated DRDO plan and all the three are as closely integrated as possible."

1.59 The Committee desired to know how many scientists working in R&D Laboratories had left the organisation during the past few years. The representative of the Ministry of Defence stated :

"The number leaving every year is very small as compared to the number of them who left the organisation in a normal course. It is less than three percent. In the organisation, the scientists are allowed to apply for any job anywhere. There is no restriction for their applying for the jobs. Whosoever gets a job in any other organisation leaves us. He is also interested to move to any country also.....the number which left was very small. It is not alarming."

1.60 The Committee called for details of the number of scientists who left the Defence Research Establishments during each of the last 10 years and the reasons therefor. The Committee also enquired whether the Ministry of Defence had analysed the reasons for the flight of the talented scientists to other countries and if so what remedial measures have been taken by way of improving their career prospects, working conditions etc. The Ministry of Defence stated :

"(a) A statement showing the details of scientists (JSO & above) who have left Defence Research Development Establishments during each of the last 10 years i.e. 1972 to 1981 and the reasons therefor are given below :

REASONS

Year	No. of Scientists (JSO and above who have left Def. Res.Estt.)	A Personal/ Domestic Grounds	B Acceptance of higher posts in Govt. PSUS.	C Resigned from abroad/ for Proceeding abroad.	D Other reasons such as voluntary retirement/ disciplinary action	Year-end sanction strength	Percentage of Col.2 to Col. 7
1	2	3	4	5	6	7	8
1972 .	34	25	9	..	..	1777	1.9%
1973 .	41	65	5	2	..	1919	2.1%
1974 .	35	23	11	1	..	2354	1.5%
1975 .	28	21	7	..	..	2504	1.1%
1976 .	29	18	8	2	1	2509	1.2%
1977 .	39	29	8	2	..	2491	1.6%
1978 .	34	20	3	3	1	2769	1.2%
1979 .	30	24	4	1	1	3219	0.9%
1980 .	56	37	13	2	4	3661	1.5%
1981 .	59	36	16	1	6	3964	1.5%

It will be seen from the figures furnished in Col. 5 that there is no significant flight of scientists to other countries.

Notwithstanding the above, the Defence Science Service Rules have been modified considerably to provide much better chances of promotion to Scientists. These rules are now called Defence Research & Development Service Rules 1978 and provide flexible complementing. A Junior Group 'A' Officer (Pay Scale : Rs. 700-1300) now called Scientists 'B' can be promoted to the higher grade of Scientists 'C' (Rs. 1100-1600) without any limitation of vacancies. At the next higher two levels, limited flexible complementing has been provided. As a result, nearly 1,000 officers were promoted to the next higher grade in the year 1980.

Massive construction work has been undertaken to provide better accommodation for the establishments|laboratories—Residential accommodation for scientists has also been provided in many of these complexes.

More modern and sophisticated equipment and machinery are being provided to facilitate Research & Development effort."

1.61 The Committee find that the designing and development of an anti-tank missile system was entrusted to a Defence Research and Development Laboratory, as a competence building project as early as in 1962 At the initiative of the user, it was converted into a staff project and necessary sanction was accorded in January, 1964. No time schedule for its completion was fixed since it was a new field of technology for which adequate know-how and even the basic infrastructure did not then exist in the country. At the time of revision of the cost estimate in 1966, it was felt that it would be possible to complete the project in 1-1|2 to 2 years. The Committee, however, regret to note that he DRDL could not develop or design the weapon system even over a period of ten years and the project had to be finally closed down in April, 1972, after incurring an expenditure of Rs. 28.72 lakhs (against the estimated cost of Rs. 6 lakhs).

1.62 The Committee observe that by January, 1969 it had become clear that the weapon under development was not suitable for induction in the army. The user trials showed that the reliability of the weapon system actually achieved was 64 per cent at a range of 1500 yards as against 90 to 95 per cent reliability required at a range of 2000 yards. It was, however, decided to continue the work on the project "to enable the scientists in the DRDL to derive maximum benefit from this project in the areas of design, development, engineering trial techniques and evaluation methods of similar weapons". The representative of the Ministry contended in the evidence before the Committee that the decision to take the project to its logical conclusion had enabled the country to go to the next step of developing a totally indigenous ground to air missile and also in developing new propulsion technology and guidance and control systems. Thus, the project had helped in competence building and in establishing a technological base in the country for the highly sophisticated field of missile technology.

1.63 The Committee find that an expenditure of Rs. 27.64 lakhs had been incurred on the project upto January 1969 and a further expenditure of Rs. 0.91 lakhs was incurred from February 1969 till closure of the project. Thus, the total expenditure on the project comes to Rs. 37.55 lakhs out of which credit to the tune of Rs. 8.82 lakhs is stated to have been given on account of salvage items/assets utilised elsewhere on the closure of the project. Since the user trials had been completed by August, 1970 the Committee consider that there was not ostensible reason for delaying the formal closure of the project till April, 1972. Much of the extra expenditure of nearly Rs. 10 lakhs on the project could therefore have been saved had the project been formally closed in August, 1970 itself.

1.64 The Committee find that the delay in development of the weapon system necessitated import of certain quantities of the two varieties of the weapon at a cost of nearly Rs. 4 crores. In addition, equipment costing Rs. 23.47 lakhs for mounting the weapon on a vehicle had also to be imported. Further, imports of mounts of a different design offered by another source were also made at a cost of Rs. 17.13 lakhs in October, 1972.

1.65 The Committee find that in December, 1969 the Vehicle Research and Development Establishment (VRDE) was asked to develop a suitable mount for deploying the weapon system 'A' on Equipment 'D' with a view to improving the operational effectiveness of these tanks. During the user trials in January, 1971 it was observed that the mounting of weapon 'A' on these tanks did not permit full exploitation of the main armament of the tank and that the characteristics of the weapon 'A' and the armament system of the tank were incompatible. In addiion, it was realised at this stage that the tanks after fitment of weapon 'A' no longer retained their offensive character and the proposal had, therefore, to be shelved. In reply to a pointed question, the Committee have been informed that 'it is correct to an extent that no other country in the world had mounted an anti-tank missile on a medium ank except France. . . . . .It was hoped that the disadvantages arising out of the immobility of the tank for a short time would be more than off set by the longer range of the missiles. Unfortunately, this did not come true". The Committee have been further informed that while the technical nature of the development of the mount was discussed with VRDE prior to assigning the project, the tactical aspects because of which the project was given up, were not discussed with the VRDE as these were not its concern. The Committee regret to observe that the fundamental question of compatibility of the two systems was not examined in all its aspects before assigning the work of development of a suitable mount to the VRDE. The very fact that a system did not obtain in any other country excepting one should have impelled the authorities to have first got the proposal examined thoroughly by a team of experts before assigning the same to the VRDE.

1.66 In February, 1971 it was decided that the weapon system 'A' should be mounted on vehicle 'E' (PT 76 tanks) for some squadrons and on vehicle 'F' for others. The Committee find that the user-cum-technical trials to which the first mount was subjected in February, 1972 showed that the same was wanting in some respects. Further trials incorporating the modifications desired were carried out. During the trials carried out in 1974 it was found that the defects which were brought out earlier still persisted. It was decided not to proceed with the further development work as it was felt that even if the mount was developed successfully in another one or two years' time, it would have only a limited utility because the residual life of the equipment 'E' would not permit their full utilisation. The project was accordingly dropped after spending Rs. 1.60 lakhs and losing another three years in the process.

1.67 In March 1974, the development of the mount for weapon 'A' on vehicle 'G' was assigned to EME by the Army Headquarters. The Committee find that an army workshop had developed a mount for weapon 'A' on this vehicle based on the mount imported in October, 1972. This mount was found suitable during trials carried out in August, 1974.

1.68 The Committee thus observe that after about five years of fruitless effort in designing and producing a suitable mount (which was urgently required in the context of the situation prevailing in 1971) through the VRDE, the problem was solved by the ingenuity of an army workshop.

1.69 From the foregoing, it would be clear that the technical feasibility of the proposal was not examined in depth by the Army Headquarters before assigning the project to VRDE. Had this been done, the process of trial and error, which ultimately resulted in nothing but waste of 5 precious years, would have been cut short, if not altogether avoided. The Committee trust that proper lessons would be drawn by Government from their experience in this case.

1.70 The Committee find that due to the abondonment of the project for development of the mount around vehicle 'E', the order for ground equipment had to be curtailed by 28.5 per cent. As a result, there was a redundancy of materials to the extent of Rs. 17.20 lakhs. It is unfortunate that orders for ground equipment were placed on the undertaking even before successful development of a suitable mount for weapon 'A'. The Committee have been informed that a policy decision has since been taken by the Ministry that no anticipatory orders will be placed on any agency unless evaluation and trials have been successfully carried out and the product has been found suitable for induction into service. The Committee trust that these instructions will be strictly followed in future. The Committee desire that the redundant material should be disposed of at the earliest to the best advanage of the State.

1.71 The Committee were informed during evidence that a macro level review of the working of Defence Research Establishments had been undertaken recently as a result of which large number of small projects have been given up. The Committee were assured that the entire long term perspective plan was now getting more and more integrated and that interaction between the users, production agencies and the DRDO was "as close to perfection as possible in a situation which is necessarily imperfect". The Committee have been further informed that more modern and sophisticated equipment and machinery is being provided to facilitate research and development effort. Defence Science Service Rules are also stated to have been modified considerably to provide better chances of promotion to the scientists. The Committee consider that in the interest of making the country self-sufficient in the field of defence hardware, it is essential that the service conditions and promotional avenues of the scientists are brought on par with those available to officers belonging to the other All India Services viz. the IAS, IPS etc. The Committee trust that the matter would be reviewed at the highest level so as to attract the best talent to man the Defence Research Establishments in the country.

SATISH AGARWAL
Chairman,
Public Accounts Committee

NEW DELHI;
April 28, 1982
Visakha 8, 1904(S)

APPENDIX

CONCLUSIONS AND RECOMMENDATIONS

Sl. No.	Para No.	Ministry Concerned	Conclusion/Recommendation
1	2	3	4
1	1.61	Defence	The Committee find that the designing and development of an anti-tank missile system was entrusted to a Defence Research and Development Laboratory, as a competence building project as early as in 1962. At the initiative of the user, it was converted into a staff project and necessary sanction was accorded in January, 1964. No time schedule for its completion was fixed since it was a new field of technology for which adequate know-how and even the basic infrastructure did not then exist in the country. At the time of revision of the cost estimate in 1966, it was felt that it would be possible to complete the project in 1½ to 2 years. The Committee, however, regret to note that the DRDL could not develop or design the weapon system even over a period of ten years and the project had to be finally closed down in April, 1972, after incurring an expenditure of Rs. 28.72 lakhs (against the estimated cost of Rs. 6 lakhs).
2	1.62	Defence	The Committee observe that by January, 1969 it had become clear that the weapon under development was not suitable for induction in the army. The user trials showed that the reliability of the weapon system actually achieved was 64% at a range of 1500 yards as against 90 to 95% reliability required at a range of 2000 yards. It was, however, decided to continue the work on the project "to enable the scientists in the DRDL to derive maximum benefit from this project in the areas of design, development, engineering trial techniques and evaluation methods of similar weapons". The representative of the Ministry contended in the evidence

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			before the Committee that the decision to take the project to its logical conclusion had enabled the country to go to the next step of developing a totally indigenous ground to air missile and also in developing new propulsion technology and guidance and control systems. Thus, the project had helped in competence building and in establishing a technological base in the country for the highly sophisticated field of missile technology.
3	1.63	Defence	The Committee find that an expenditure of Rs. 27.64 lakhs had been incurred on the project upto January 1969 and a further expenditure of Rs. 9.91 lakhs was incurred from February 1969 till closure of the project. Thus, the total expenditure on the project comes to Rs. 37.55 lakhs out of which credit to the tune of Rs. 8.82 lakhs is stated to have been given on account of salvage items/assets utilised elsewhere on the closure of the project. Since the user trials had been completed by August, 1970, the Committee consider that there was no ostensible reason for delaying the normal closure of the project till April, 1972. Much of the extra expenditure of nearly Rs. 10 lakhs on the project could therefore have been saved had the project been formally closed in August, 1970 itself.
4	1.64	Defence	The Committee find that the delay in development of the weapon system necessitated import of certain quantities of the two varieties of the weapon at a cost of nearly Rs. 4 crores. In addition, equipment costing Rs. 23.47 lakhs for mounting the weapon on a vehicle had also to be imported. Further, imports of mounts of a different design offered by another source were also made at a cost of Rs. 17.13 lakhs in October, 1972.
5	1.65	Defence	The Committee find that in December, 1969 the Vehicle Research and Development Establishment (VRDE) was asked to develop a suitable mount for deploying the weapon system 'A' on Equipment 'D' with a view to improving the operational effectiveness of these tanks. During the user trials in January, 1971 it was observed that the mounting of weapon 'A' on these tanks did not permitfull exploitation of the main armament of the tank and

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			that the characteristics of the weapon 'A' and the armament system of the tank were incompatible. In addition, it was realised at this stage that the tanks after fitment of weapon 'A' no longer retained their offensive character and the proposal had, therefore, to be shelved. In reply to a pointed question, the Committee have been informed that 'it is correct to an extent that no other country in the world had mounted an anti-tank missile on a medium tank, except France...It was hoped that the disadvantages arising out of the immobility of the tank for a short time would be more than off set by the longer range of the missiles. Unfortunately, this did not come true". The Committee have been further informed that while the technical nature of the development of the mount was discussed with the VRDE prior to assigning the project, the tactical aspects because of which the project was given up, were not discussed with the VRDE as these were not its concern. The Committee regret to observe that the fundamental question of compatibility of the two systems was not examined in all its aspects before assigning the work of development of a suitable mount to the VRDE. The very fact that such a system did not obtain in any other country excepting one should have impelled the authorities to have first got the proposal examined thoroughly by a team of experts before assigning the same to the VRDE.
6	1.66	Defence	In February, 1971 it was decided that the weapon system 'A' should be mounted on vehicle 'E' (PT 76 tanks) for some squadron and on vehicle 'F' for others. The Committee find that the user-cum-technical trials to which the first mount was subjected in February, 1972 showed that the same was wanting in some respects. Further trials incorporating the modifications desired were crried out. During the trials carried out in 1974 it was found that the defects which were brought out earlier still persisted. It was decided not to proceed with the further development work as it was felt that even if the mount was developed successfully in another one or two years' time, it would have only a limited utility because the residual

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			life of the equipment 'E' would not permit their full utilisation. The project was accordingly dropped after spending Rs. 1.60 lakhs and losing another three years in the process.
7	1.67	Defence	In March 1974, the development of the mount for weapon 'A' on vehicle 'G' was assigned to EME by the Army Headquarters. The Committee find that an army workshop had developed a mount for weapon 'A' on this vehicle based on the mount imported in October, 1972. This mount was found suitable during trials carried out in August, 1974.
8	1.68	Defence	The Committee thus observe that after about five years of fruitless effort in designing and producing a suitable mount (which was urgently required in the context of the situation prevailing in 1971) through the VRDE, the problem was solved by the ingenuity of an army workshop.
9	1.69	Defence	From the foregoing, it would be clear that the technical feasibility of the proposal was not examined in depth by the Army Headquarters before assigning the project to VRDE. Had this been done, the process of trial and error, which ultimately resulted in nothing but waste of 5 precious years, would have been cut short, if not altogether avoided. The Committee trust that proper lessons would be drawn by Government from their experience in this case.
10	1.70	Defence	The Committee find that due to the abandonment of the project for development of the mount around vehicle 'E', the order for ground equipment had to be curtailed by 28.5%. As a result, there was redundancy of materials to the extent of Rs. 17.20 lakhs. It is unfortunate that orders for ground equipment were placed on the undertaking even before successful development of a suitable mount for weapon 'A'. The Committee have been informed that a policy decision has since been taken by the Ministry that no anticipatory orders will be placed on any agency unless evaluation and trials have been successfully carried out and the product has been found suitable for induction

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			into service. The Committee trust that these instructions will be strictly followed in future. The Committee desire that the redundant material should be disposed of at the earliest to the best advantage of the State.
11	1.71	Defence	The Committee were informed during evidence that a macro level review of the working of Defence Research Establishments had been undertaken recently as a result of which large number of small projects have been given up. The Committee were assured that the entire long term perspective plan was now getting more and more integrated and that interaction between the users, production agencies and the DRDO was "as close to perfection as possible in a situation which is necessarily imperfect". The Committee have been further informed that more modern and sophisticated equipment and machinery is being provided to facilitate research and development effort. Defence Science Service Rules are also stated to have been modified considerably to provide better chances of promotion to the scientists. The Committee consider that in the interest of making the country self-sufficient in the field of defence hardware, it is essential that the service conditions and promotional avenues of the scientists are brought on par with those available to officers belonging to the other All India Services viz., the IAS, IPS etc. The Committee trust that the matter would be reviewed at the highest level so as to attract the best talent to man the Defence Research Establishments in the country.

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